

Remarks/Arguments

In the Office Action dated January 6, 2009, it is noted that claims 1-19 are pending and that claims 1-19 stand rejected under 35 U.S.C. §103.

By this response claims 1-14 and 16-17 have been amended. Claims 1, 8, and 9 have been amended to clarify an aspect of the claimed subject matter with respect to the first and second signals. Dependent claims 2-4, 6, 10-14, and 16-17 have been amended to be consistent with their respective antecedents. Claims 5 and 7 have been amended to make an editorial change to the grammar by deleting the term "act". No new matter has been added.

Cited Art

The following references have been cited and applied against the claims: U.S. Patent 6,037,984 to Isnardi et al. (hereinafter referenced as "*Isnardi*"), U.S. Patent 6,876,592 to Srinivasan et al. (hereinafter referenced as "*Srinivasan*"), and an article entitled, "*Digital Watermarking of MPEG-2 Coded Video In The Bitstream Domain*," by Hartung et al. (hereinafter referenced as "*Hartung*").

Rejection of Claims 1-2, 6, 8-10, 14, and 16-18 under 35 U.S.C. §103

Claims 1-2, 6, 8-10, 14, and 16-18 stand rejected under 35 U.S.C. §103 as being unpatentable over Isnardi in view of Srinivasan. This rejection is respectfully traversed.

Claims 1, 8, and 9 are independent base claims. Claims 2 and 6 depend directly from claim 1; and claims 10, 14, and 16-18 depend ultimately from claim 9. Claims 1, 8 and 9 include substantially similar limitations that are patentably distinguishable from the cited art. Although the remarks below will be directed to claim 1, they are intended to apply equally to independent claims 8 and 9 without further express reference thereto.

The claimed invention is related to watermarking a compressed information signal. In an exemplary embodiment, the watermark information is added to the compressed information signal **only if** the addition of the watermark information increases the length of a repeating stream, thereby increasing the compression efficiency of the run-length encoding. Because it is desirable that the watermark modifications produce a minimal impact on the ultimate compressed information signal,

the watermark is added **only if** the compressed information signal being modified has a non-zero signal sample and the modification causes the modified signal sample value to be zero.

Isnardi appears to watermark his information signal with the entire watermark regardless of the watermark's effect on increasing the bit-count of the resulting signal within a predefined bit budget. *See Isnardi at col. 2, lines 9-12.* Isnardi appears to teach a watermarking method by maintaining all the elements of a watermark when combining the watermark with the information signal. Isnardi states that he performs the watermarking without limiting the watermark signal. *See Isnardi at col. 2, lines 15-18.*

As admitted on page 4 of the present Office Action, Isnardi fails to teach modifying a signal sample in accordance with a watermark pattern **only if** the modified signal sample equals zero, as defined in claim 1. Instead, Isnardi performs his watermarking technique by masking a signal sample to be watermarked in such a way that specific coefficients in the signal sample are set to zero prior to combining these zeroed signal samples with the watermark. *See Isnardi, col. 4, lines 23-34.* The specific coefficient locations correspond to the locations where the watermark information is to be added. *See Isnardi at col. 2, lines 20-23.* In this way, the watermark coefficients unconditionally replace the selected signal sample coefficients corresponding to the watermark locations. *See Isnardi at col. 2, lines 23-27.* That is, Isnardi unconditionally replaces the selected signal sample having a zero value at the watermark location. The coefficient for the watermarked signal resulting from the addition of the watermark coefficient to the zeroed signal sample coefficient is non-zero.

Isnardi recognizes that his technique will increase the bit count for the watermarked signal over the non-watermarked signal. *See Isnardi at col. 6, lines 11-29.* He even suggests a technique for minimizing the overall bit count increase. *See Isnardi at col. 6, lines 19-29.* But it is clear that Isnardi intends to take whatever measures are necessary to maintain the watermark without limitation, even when that means that the bit count per watermarked block increases within the limits of a predefined bit budget.

As stated above, Isnardi fails to teach modifying a signal sample in accordance with a watermark pattern **only if** the modified signal sample equals zero, as defined in claim 1. It is said in the present Office Action that Srinivasan was added to Isnardi to

remedy this deficiency in Isnardi. But it is clear that Srinivasan does not remedy the deficiency in Isnardi. Srinivasan is similar to, and cumulative over, Isnardi. Moreover, Srinivasan does not even teach watermarking of signals.

Srinivasan includes no teaching, showing, or suggestion of, for example “second signal samples having a non-zero value,” “modifying the second signal samples in accordance with the watermark to produce a modified signal sample, wherein the modifying is applied to the second signal samples only if the modified signal sample equals zero,” as defined in claim 1. In apparent support of the rejection of this limitation in the claims, the present Office Action points to Srinivasan’s statement that “the encoder modifies the transform of the original signal by replacing at least some and preferably all of the coefficients whose values are zero with corresponding nominal randomly selected non-zero values.” *See Srinivasan at col. 14, lines 38-44.*

The reliance on Srinivasan is misplaced because Srinivasan appears to teach exactly the opposite of the claimed limitation. Srinivasan changes the transformed coefficients that are zero to a non-zero value. By applying the modification in this manner, Srinivasan causes his resulting coefficients to be non-zero valued. In contrast, the present invention as claimed applies the modification to the samples that have a non-zero value to begin with so that, as a result of the modification, the corresponding modified samples have a zero value. *See Applicant’s claim 1 and the specification at page 4, lines 11-21.* Thus, Srinivasan is exactly opposite to the Applicant’s teachings. It should be noted that, by operating in this manner, Applicant’s claimed invention provides the stated benefit that the resulting signal after watermarking has an increased number of zero coefficients in the DCT block so that it can be more efficiently encoded than the original signal. *See Applicant’s specification at page 4, lines 22-26.*

The techniques proposed by both Srinivasan and Isnardi do not create an increased number of zero-valued coefficients in a watermarked signal. They do just the opposite. That is, they create non-zero valued coefficients in the watermarked signal. The techniques proposed by Srinivasan and Isnardi change the zero-valued coefficients in the selected signal into non-zero coefficients. *See Isnardi’s masked signal and Srinivasan’s transformed original signal.* The resulting coefficient values in either one of the applied techniques are non-zero. This is an opposite result to that claimed by

Applicant. Thus, neither Srinivasan nor Isnardi teach, show, or suggest the limitations in claim 1.

In light of the remarks above and in view of the remarks above with respect to the substantial similarity between the limitations in claims 8 and 9, it is believed that the independent base claims 1, 8, and 9 and the claims dependent thereon would not have been obvious to a person of ordinary skill in the art upon a reading of Isnardi and Srinivasan, either separately or in combination. Therefore, it is submitted that claims 1-2, 6, 8-10, 14, and 16-18 are allowable under 35 U.S.C. §103. Withdrawal of this rejection is respectfully requested.

Rejection of Claims 3-5, 7, 11-13, 15, and 19 under 35 U.S.C. §103

Claims 3-5, 7, 11-13, 15, and 19 stand rejected under 35 U.S.C. §103 as being unpatentable over Isnardi in view of Srinivasan and further in view of Hartung. This rejection is respectfully traversed.

The combination of Hartung with Isnardi and Srinivasan is improper because Isnardi expressly teaches away from the teachings of Hartung. *See Isnardi at col. 1, line 26 through col. 2, line 12.* Hartung represents the very prior art problem that Isnardi seeks to remedy. Hartung apparently modifies the DCT information signal by using less than the entire watermark. Isnardi expressly avoids removing any portion of the watermark signal. *See Isnardi at col. 2, lines 9-12.* Isnardi does not want to limit the watermark signal information in any way, even if that means that the bit count of the resulting watermarked signal is increased over the original signal. Isnardi uses the entire watermark signal, not less than the entire watermark signal as proposed by Hartung. Thus, Isnardi is contrary to the teachings of Hartung and cannot be combined with Hartung. There is clearly no express motivation in the references themselves to make this combination of contradictory teachings.

As stated above, claims 1 and 9 are independent base claims. Claims 3-5 and 7 depend ultimately from claim 1; and claims 11-13, 15, and 19 depend ultimately from claim 9. Also as stated above, claims 1 and 9 include substantially similar limitations that are patentably distinguishable from the cited art. Thus, the remarks below will be directed to the method claim set based on independent claim 1, and are intended to

apply equally to the set of claims dependent from claim 9 without further express reference thereto.

Hartung appears to teach a comparison of two DCT coefficient streams prior to transmission to determine which one is to be used for transmission. *See Hartung's Figure 6 and the accompanying description at page 2623, left column.* One DCT coefficient stream is formed by inversely encoding, inversely quantizing, watermarking, quantizing, and encoding the original DCT coefficient stream. The other DCT stream is the original DCT coefficient stream without any operations being performed thereon. The output DCT coefficient stream is selected as one or the other of the two DCT streams described above. Hartung does not even suggest operating at the sample value level to determine whether or not to watermark a signal. Instead, Hartung ignores the sample values before and after watermarking and simply compares the number of bits in the two DCT streams to select an output stream. Hartung therefore does not even remotely suggest, for "second signal samples having a non-zero value", "modifying the second signal samples in accordance with the watermark to produce a modified signal sample, wherein the modifying is applied to the second signal samples only if the modified signal sample equals zero", as defined in independent claim 1.

It has already been discussed in detail above that neither Isnardi nor Srinivasan teaches, shows, or suggests, for "second signal samples having a non-zero value", "modifying the second signal samples in accordance with the watermark to produce a modified signal sample, wherein the modifying is applied to the second signal samples only if the modified signal sample equals zero", as defined in independent claim 1. Hartung does not remedy this deficiency in Srinivasan or Isnardi. Even if the combination of Hartung with Isnardi and Srinivasan is assumed to be correct and proper as proposed in the present Office Action, an assumption with which Applicant neither agree nor acquiesce, the proposed combination of references does not teach, show, or suggest the cited limitation defined in Applicant's independent base claims. Therefore, the combination of Isnardi, Srinivasan, and Hartung does not teach, show, or suggest all the elements of Applicant's claimed invention.

In light of the remarks directly above and in view of the remarks above with respect to base claim 1 and the substantial similarity between the limitations in base claim 1 and the limitations in base claim 9, it is believed that the claims 3-5, 7, 11-13,

15, and 19 would not have been obvious to a person of ordinary skill in the art upon a reading of Isnardi, Srinivasan, and Hartung, either separately or in combination. Therefore, it is submitted that claims 3-5, 7, 11-13, 15, and 19 are allowable under 35 U.S.C. §103. Withdrawal of this rejection is respectfully requested.

Conclusion

In view of the foregoing, it is respectfully submitted that all the claims pending in this patent application are in condition for allowance. Entry of this amendment, reconsideration of the application, and allowance of all the claims are respectfully solicited.

In the event there are any errors with respect to the fees for this response or any other papers related to this response, the Director is hereby given permission to charge any shortages and credit any overcharges of any fees required for this submission to Deposit Account No. 14-1270.

Respectfully submitted,

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